Acknowledgment

The United College Distinguished Visiting Scholar Committee acknowledges with thanks the generous grant from the United College Endowment Fund which has made possible the visit of Professor David C. Geary, Curators’ Professor and Thomas Jefferson Professor of Psychology and Interdisciplinary Neuroscience, University of Missouri, the United States, to United College as our Distinguished Visiting Scholar in 2014-2015.

Distinguished Visiting Scholar Committee
United College
Early Predictors of Mathematics Achievement and Achievement Growth
數學成績和成績增長的早期預測
Thursday, 23 October 2014, 4:30 pm, Sir Run Run Shaw Hall, CUHK
2014年10月23日(星期四). 香港中文大學邵逸夫堂

Evolution of Trait Vulnerability
脆弱特質的進化
Monday, 27 October 2014, 4:30 pm, Lecture Theatre 1, Esther Li Building, CUHK
2014年10月27日(星期一), 香港中文大學利鏗樓1號演講廳

Lectures in English  英語主講
Enquiries: 39437455 / 39437598
A Warm Welcome to Professor David Geary

Professor Geary was born in Providence, Rhode Island and lived in the Northeast U.S. until moving to Los Angeles with his family when he was 11, and then to the San Francisco Bay Area in California. He attended Santa Clara University, and then completed an M.S. degree in clinical child/school psychology at California State University, East Bay. During this time he worked as a volunteer on a blood pressure study directed by Professor Mel Hovell, then at Stanford University, in keeping with a long standing interest in research. Upon completion of the program and working for a year, Professor Geary entered the Ph.D. program in developmental psychology at the University of California, Riverside, first focusing on sex differences in the brain lateralization of cognition and then cognitive arithmetic. After spending a year at the University of Texas at El Paso and two years at Missouri Science and Technology University (formerly, University of Missouri – Rolla), he accepted his current position at the University of Missouri, where he is a Curators’ Professor in the Department of Psychological Sciences and the Interdisciplinary Neuroscience Program. In addition to being a Curators’ Professor, Geary was awarded the 2009-2011 system-wide Thomas Jefferson Professorship for his wide-ranging scholarship. His research on mathematical cognition and learning has been funded by the National Institutes of Health (NIH) and the National Science Foundation, and resulted in a prestigious NIH MERIT award. In 2006, he was asked by the White House to serve on the President’s National Mathematics Advisory Panel and served as the Chair of the Learning Processes Task Group. In 2007, he was appointed by President Bush to the National Advisory Board that oversees the activities of the Institute for Education Sciences, the research arm of the U.S. Department of Education. In 2009, Geary and colleagues received the prestigious George Miller Award (best general article in psychology) from the American Psychological Association for a monograph on sex differences in mathematics and science, and in 2011 he was elected fellow of the American Association for the Advancement of Science.

Over the course of his career, Professor Geary has developed two, influential and largely independent research programs. Professor Geary’s research in mathematical cognition and learning has included the mathematical modeling of the processes that underlie adults’ and children’s basic arithmetic abilities to the sources of cross-national (China, U.S.) differences in mathematics achievement to the inherent numerical abilities that contribute to young children’s early learning of formal, symbolic mathematics. Professor Geary’s book, Children’s Mathematical Development (1994), was the first to integrate mathematical cognition and learning from the inherent competencies of non-human animals to educational practices. The book continues to be cited and in fact was recently (2012) translated into Korean. In this area, he’s best known for his groundbreaking research on the cognitive mechanisms underlying children’s learning deficits
in mathematics. Professor Geary’s 1993 review article (published in Psychological Bulletin, one of the top journals in all of psychology) on the topic identified different subtypes of learning disability and has provided the organizational foundation for the field over the past two decades. He directed a 10-year, NIH funded, longitudinal study of mathematical learning and learning disabilities that helped to identify the beginning of schooling numerical knowledge that predicts long-term success and learning deficits in mathematics, among other contributions. He is currently collaborating with Professor Vinod Menon at Stanford University School of Medicine on brain imaging studies of mathematical learning disabilities and they have identified aspects of the prefrontal-hippocampal-parietal network that appear to be the source of one of the learning disability subtypes Professor Geary identified in 1993. Professor Geary is also collaborating with Professor Lynn Fuchs at Vanderbilt University on the development and testing (randomized clinical trials) of interventions to address this form of learning disability. Finally, he is co-editing a five-volume series of books on Mathematical Cognition and Learning with Professor Dan Berch at the University of Virginia and Dr. Kathy Mann Koepke at NIH. The first volume, Evolutionary origins and early development of basic number processing will be released in November, 2014.

During his Ph.D. training Professor Geary took coursework in comparative and physiological psychology and based on this developed a keen interest in evolution and it’s application to psychology; now known as evolutionary psychology. Soon after he was awarded tenure, he published influential theoretical articles in Behavioral and Brain Sciences and American Psychologist on differences between evolved cognitive abilities (e.g., language or number sense) and academic abilities that are acquired through formal schooling (e.g., reading, symbolic arithmetic). His distinction between biologically-primary (evolved) and biologically-secondary (school taught) abilities has profound implications for the development of educational systems, not only in mathematics but broadly, and has led to the emergence of a subfield within education known as evolutionary educational psychology. Professor Geary also turned his attention back to his graduate-school interest in sex differences and in 1998 published what is now considered a classic, Male, female: The evolution of human sex differences.  In this book, Professor Geary took Darwin’s basic principles of sexual selection (i.e., competition for mates and mate choice) and applied them to integrate within a single conceptual framework human sex differences in parenting, culturally-contingent ways of competing for status and mates, mate choice preferences, motivational and affective biases, play, social development and brain and cognition. An expanded and updated version of this work was published in 2010. In between the first and second editions of this book, Professor Geary turned his attention to an unresolved issue in evolutionary psychology, that is, the hypothesis that the brain evolved domain specific modules, for instance, for face processing or navigation, and a large body of empirical evidence supporting the existence of a domain general ability to learn, known as general fluid intelligence. In the context of hominid brain evolution and the neurobiology of brain development,

Professor Geary’s current focus is on the vulnerability of sexually selected traits to disruption by ecological and social stressors. These are traits, such as the peacock’s tail, that have been elaborated by mate choices or competition for mates and have evolved such that they are signals of the individuals’ ability to withstand exposure to parasites and nutritional and social stressors. Taking this idea, Professor Geary and colleagues at the University of Missouri developed an animal model of trait vulnerability and demonstrated that the development and expression of sexually selected traits are indeed easily disrupted by exposure to stressors; specifically, they demonstrated that prenatal exposure to toxins selective affects these traits but not other traits. Professor Geary is currently working on a book, *Evolution of vulnerability: Condition dependent trait expression and human health and development*, that applies this principle to more fully understand the effects of toxins, parasites, chemotherapy, childhood abuse and other stressors on human health and development.

A productive and prolific researcher and writer with over 250 journal publications, 6 authored and co-authored books, and numerous edited volumes, Professor Geary has also been invited to give lectures by research institutions worldwide. These include Harvard, MIT, University of London, Max Planck Institute Berlin, University of Vienna, to name just a few. Joining these renowned institutions, the Chinese University of Hong Kong has the privilege and honor to invite Professor Geary to speak to us as the United College Distinguished Visiting Scholar. On behalf of the faculty and students of the United College and Chinese University of Hong Kong, I would like to express our warmest welcome to Professor David Geary.

Chang Lei
Department of Educational Psychology
The Chinese University of Hong Kong
Lecture Synopsis – Lecture One
Early Predictors of Mathematics Achievement and Achievement Growth

The Missouri Studies include kindergarten to ninth grade and preschool school to first grade longitudinal investigations of the cognitive underpinnings of children’s mathematical learning and risk of learning disability. Geary will discuss recent results from the first study, focusing on school entry predictors of employment related numeracy in adolescents. Specifically, adolescents were administered numeracy measures that predict employability and wages in young adults. Beginning of first grade knowledge of Arabic numerals, the magnitudes they represent and the relations among them predicted numeracy scores more than six years later, controlling for intelligence, working memory, in-class attentive behavior, and demographic factors. One goal of the second study is to determine the preschool quantitative knowledge that predicts first grade numeral knowledge. The study is in progress, but Geary will discuss early results on the relation between preschooler’s inherent sensitivity to magnitude and its relation to their learning of numerals and number words and to mathematics achievement more broadly.

Lecture Synopsis – Lecture Two
Evolution of Trait Vulnerability

Biologists have known for decades that many, probably most, traits involved in competition for mates or mate choice are exaggerated and their expression is influenced by the health, fitness, genes, etc. of the individual. For instance, the bright plumage of the males of many species of bird can only be expressed by healthy males; in part because sick males’ active immune system suppresses the testosterone needed to express the traits. The sensitivity of these traits to environmental and social conditions evolved so that less fit individuals cannot ‘fake’ good health, provisioning potential etc. The concept has been applied to humans for some traits (e.g., male facial features) but not widely. Geary will review these studies but more importantly will reframe the issue entirely. He will illustrate that when applied to humans, condition dependent traits can be used to identify children, adolescents, or populations at risk for poor long-term outcomes.
Academic Profile of Professor David C. Geary

A. Honors and Awards

1. Award for Research Excellence, MENSA Education and Research Foundation, 1992

2. Chancellor's Award for Outstanding Faculty Research and Creative Activity in the Behavioral and Social Sciences, 1996


4. National Institutes of Health MERIT Award

5. 2009 G. A. Miller Award, American Psychological Association for Halpern et al. (2007)

6. Fellow, American Association for the Advancement of Science (2011)

B. National Service (USA)

1. Member, President’s National Mathematics Advisory Panel; Chair, Learning Processes Task Group (2006-2008)


C. Selective Publications

(100 out of ~250 peer-reviewed full-length papers in peer-reviewed scientific journals, as well as many other articles and book chapters)


D. Books


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<th>Year</th>
<th>Name and Institution (Discipline)</th>
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<tbody>
<tr>
<td>Jan 1982</td>
<td>Professor C.N. YANG 楊振寧教授 State University of New York (Physics)</td>
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<td>Apr 1982</td>
<td>Professor Stuart SCHRAM 宣道華教授 University of London (History)</td>
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<td>Jan 1983</td>
<td>Professor Ezra VOGEL 傅高義教授 Harvard University (Sociology)</td>
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<td>Dec 1985</td>
<td>Professor Samuel FINER 范乃三教授 Oxford University (Political Science)</td>
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<tr>
<td>Apr 1985</td>
<td>Professor Peng-yuan CHANG 張朋園教授 National Taiwan Normal University (History)</td>
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<td>Mar 1986</td>
<td>Professor Lawrence J. LAU 劉遵義教授 Stanford University (Economics)</td>
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<td>Sep 1986</td>
<td>Professor K.C. CHANG 張光直教授 Harvard University (Archaeology)</td>
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<td>Nov 1986</td>
<td>Professor Shing-shen CHERN 鄭清身教授 Nankai University (Mathematics)</td>
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<td>Nov 1986</td>
<td>Dr. Franklin CHANG-DIAZ 張福林博士 NASA Plasma Fusion Center (Space Science)</td>
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<td>Jan 1988</td>
<td>Professor Norton GINSBURG 金斯伯教授 East-West Center (Geography)</td>
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<td>Nov 1988</td>
<td>Professor Robin M. NORRIS 羅理思教授 University of Auckland (Medicine)</td>
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<tr>
<td>Apr 1989</td>
<td>Professor Ky FAN 樊璣教授 University of California, Santa Barbara (Mathematics)</td>
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<tr>
<td>Nov 1989</td>
<td>Professor Jan. SVARTVIK 史華域教授 Lund University (English Language)</td>
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<td>Nov 1990</td>
<td>Professor Wlodzimierz BRUS 布魯斯教授 Oxford University (Social Economics)</td>
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<tr>
<td>Oct 1991</td>
<td>Professor B. SCHLESINGER 施樂生教授 University of Toronto (Social Work)</td>
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<td>Mar 1992</td>
<td>Professor Jonathan SPENCE 史景遷教授 Yale University (History)</td>
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<td>Feb 1993</td>
<td>Professor Kwang-chung YU 余光中教授 National Sun Yat-sen University (Chinese Language)</td>
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<td>Apr 1993</td>
<td>Professor Richard PORTES 潘迪思教授 University of London (Economics)</td>
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<td>Nov 1993</td>
<td>Professor Sidney GREENBAUM 郭思言教授 University London College (English Language)</td>
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<td>Mar 1994</td>
<td>Professor Janos KORNAY 慕乃爾教授 Harvard University (Finance)</td>
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<td>Nov 1994</td>
<td>Professor Feng-sheng HE 何鳳生教授 Institute of Occupational Medicine (Medicine)</td>
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<td>Mar 1995</td>
<td>Professor James CAHILL 高居翰教授 University of California (Art History)</td>
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<td>Nov 1995</td>
<td>Professor Graham FISHBURNE 費伯恩教授 University of Alberta (Education)</td>
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<td>Mar 1996</td>
<td>Professor Shupeng CHEN 陳述 bénéfic教授 Institute of Remote Sensing Applications Chinese Academy of Science (Science)</td>
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<td>Oct 1996</td>
<td>Professor Chia-ying YEH 葉嘉瑩教授 University of British Columbia (Asian Studies)</td>
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<td>Nov 1996</td>
<td>Dr. Leroy CHIAO 焦立中博士 NASA Space Center (Space Science)</td>
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<tr>
<td>Mar 1997</td>
<td>Professor Gillian BROWN 鮑姬蓮教授 Cambridge University (English Language)</td>
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<td>Dec 1997</td>
<td>Dr. David Da-i HO 何大一博士 Aaron Diamond AIDS Research Center (Medicine)</td>
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<td>Mar 1998</td>
<td>Professor John W. REPS 韋約翰教授 Cornell University (City Planning)</td>
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<td>Oct 1998</td>
<td>Professor Marilyn S. ALBERT 艾美蓮教授 Harvard Medical School (Psychology)</td>
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<td>Mar 1999</td>
<td>Professor Harry HARDING 何漢理教授 The George Washington University (Political Science)</td>
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<td>Nov 1999</td>
<td>Professor Janice MORSE 莫珍寧教授 University of Alberta (Nursing)</td>
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<td>Feb 2000</td>
<td>Professor Arthur ELLIS 艾禮詩教授 University of Wisconsin-Madison (Material Science)</td>
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<td>Nov 2000</td>
<td>Professor Kenneth DODGE 杜甘夫教授 Duke University (Educational Psychology)</td>
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<td>Mar 2001</td>
<td>Professor Paul VANHOUTTE 尹浩德教授 Institut de Recherches Internationale Server (Medicine)</td>
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<td>Nov 2001</td>
<td>Professor M. F. HAWTHORNE 霍桑教授 University of California, Los Angeles (Chemistry)</td>
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<td>Mar 2002</td>
<td>Professor Richard ESTES 倪思迪教授 University of Pennsylvania (Social Work)</td>
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<td>Nov 2002</td>
<td>Professor Tony F. CHAN 陳煒昌教授 University of California, Los Angeles (Mathematics)</td>
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<tr>
<td>Mar 2003</td>
<td>Professor Yuan T. LEE 李進哲教授 Academia Sinica, Taiwan (Chemistry)</td>
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<tr>
<td>Mar 2004</td>
<td>Professor Zhi-an DONG 董治安教授 Shandong University (Chinese Language)</td>
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<tr>
<td>Mar 2004</td>
<td>Professor Zeng-yi QIAN 錢曾怡教授 Shandong University (Chinese Language)</td>
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Mission of the College

In elaborating the College motto “Make One’s Virtues Shine and Renew the People”, United College strives to serve the people of Hong Kong and China and the world through integrative education, pastoral care as well as moral and spiritual enhancement of the young.